

## CLAIM AMENDMENTS

1           1. (Currently amended) A substantially two-phase hard  
2       metal substrate body consisting essentially of a WC hard material  
3       phase consisting of WC and a binder phase of 3 to 25 mass % which  
4       apart from at least one of the binder metals Fe, Co and/or Ni  
5       contains up to 15 mass % of a dissolved dopant selected from the  
6       group consisting of Al, Cr, V, Nb, Ta, Ti, Zr, and Hf, wherein the  
7       percentage proportion of all dopants as a whole in the two-phase  
8       hard metal substrate body is limited to a maximum of 4 mass %;  
9       wherein the proportion of a cubic phase consisting of said dopant  
10      in undissolved form in the two-phase hard metal substrate is less  
11      than 4 volume % and; wherein the binder metal content in an edge  
12      zone of the two-phase hard metal substrate drops to less than half  
13      the binder metal content in the substrate body interior.

1           2. (Currently amended) The substantially two-phase hard  
2       metal substrate body according to claim 1 wherein the concentration  
3       of the binder metal in the binder phase falls gradually toward the  
4       substrate body surface and the concentration of the dopant in the  
5       binder phase gradually increases in a corresponding manner.

1           3. (currently amended) The substantially two-phase hard  
2       metal substrate body according to claim 1 wherein the grain size of  
3       the WC is  $\leq 1.5 \mu\text{m}$  whereby the WC fine hard material phase (grain

4       size  $\leq$  0.8  $\mu\text{m}$ ) and/or with WC ultrafine grain hard material phase  
5       (grain size  $\leq$  0.5  $\mu\text{m}$ ), preferably contain Cr, V and/or Ta as  
6       dopant.

1           4. (Currently amended) The substantially two-phase hard  
2       metal substrate body according to claim 1 wherein at least one  
3       layer is applied to the substrate body surface, the layer being  
4       comprised of a carbide, nitride and/or carbonitride of Ti, Zr  
5       and/or Hf and/or of  $\text{Al}_2\text{O}_3$ ,  $\text{HfO}_2$ ,  $\text{ZrO}_2$ , oxides, amorphous carbon,  
6       diamond, cubic boron nitride, carbon nitride ( $\text{CN}_x$ ) or another  
7       compound of at least one of the elements B, C, N and/or O.

1           5. (currently amended) The substantially two-phase hard  
2       metal substrate body according to claim 1 wherein in the boundary  
3       zone close to the surface there is an enrichment with nitride or  
4       carbonitride of the metal dopant.

1           6. (Currently amended) A method of producing a two-phase  
2       hard metal substrate body according to claim 1 in which [[the]] a  
3       starting mixture consisting of WC, a binder metal, and a dopant is  
4       preheated powder metallurgically and is prepressed to a green body  
5       and then in an atmosphere of a furnace is heated and sintered,  
6       characterized in that wherein in the heating phase, after reaching  
7       the eutectic, but no later than reaching the sintering temperature  
8       the vacuum or inert gas atmosphere is replaced with a  $\text{N}_2$  atmosphere

9       with a N<sub>2</sub> pressure of  $\leq 10^5$  Pa and is maintained at least until the  
10      sintering temperature is reached.

1           7. (Currently amended) The method of making a two-phase  
2      hard metal substrate body according to claim 1 in which the  
3      starting mixture is powder metallurgically treated and is pressed  
4      to a green body and finally heated in an atmosphere of a furnace  
5      and sintered, ~~characterized in that wherein~~ after finish sintering  
6      or optionally in a final treatment above the eutectic temperature,  
7      the sintered body is maintained in a N<sub>2</sub> atmosphere under a pressure  
8      (p) of  $10^5$  Pa  $< p < 10^7$  Pa for at least 10 minutes.

1           8. (Currently amended) The method according to claim 6  
2      ~~characterized in that wherein~~ the nitrogen atmosphere is  
3      established by introducing precursors that is N-containing gases  
4      whereby the nitrogen is formed *in situ* in the gas atmosphere.

1           9. (Currently amended) The method according to claim 6  
2      ~~characterized in that wherein~~ the two-phase hard metal substrate  
3      body is heated up to 1250°C during the heating phase and this  
4      temperature is held for at least 20 minutes, ~~preferably more than~~  
5      1-hour, before the heating up is continued to the sintering  
6      temperature.

1                   10. (Currently amended) The method according to claim 6  
2 ~~characterized in that wherein~~ initially in the heating up phase at  
3 about 1200°C the previously existing vacuum is replaced by an inert  
4 gas atmosphere, preferably with a pressure of 103 Pa to 104 Pa and  
5 only upon reaching the sintering temperature is a nitrogen  
6 containing atmosphere established with a higher pressure, -  
7 preferably > 104 Pa.

1                   11. (Currently amended) The method according to claim 6  
2 ~~characterized in that wherein~~ the heating up rate and the cooling  
3 down rate amounts to up to 10°C/min, -preferably between 2°C/min  
4 and 5°C/min.

1                   12. (Currently amended) The method according to claim 6  
2 ~~characterized in that wherein~~ the starting mixture contains in an  
3 amount of up to 15 mass % of the binder phase additional carbides,  
4 nitrides, carbonitrides of the elements of Group IVa or VIa of the  
5 periodic system or Al or complex carbides, complex nitrides and/or  
6 complex carbonitrides of the form Ti<sub>2</sub>AlC, Ti<sub>2</sub>AlN, Cr<sub>2</sub>AlN, Cr<sub>2</sub>AlC.